Ruby master - Bug #17268
special global variables which can be accessed from ractors
10/20/2020 01:47 AM - ko1 (Koichi Sasada)

Status: Closed
Priority: Normal
Assignee: 
Target version: 
ruby -v: 
Backport: 2.5: UNKNOWN, 2.6: UNKNOWN, 2.7: UNKNOWN

Description
Ractors can’t access global variables, but some special global variables should be accessed. There are several types.

Proposal
(1) Read-only global variables

```ruby
# process-local (readonly): other commandline parameters
'$-p' => $-p,
'$-l' => $-l,
'$-a' => $-a,

# process-local (readonly): getpid
'$$' => $$,
```

(2) scope local variables

```ruby
# thread local: process result
'$$?' => $$?,

# scope local: match
'$~' => $~.inspect,
'$$&' => $$&,
'$$' => $$,
'$\'' => '$',
'$+.' => '$+',
'$1' => $1,

# scope local: last line
'$_' => $_,

# scope local: last backtrace
'$@' => $@,
'$!' => $!,
```

(3) Ractor local variables

```ruby
# ractor-local (derived from created ractor): debug
'$DEBUG' => $DEBUG,
'$-d' => $-d,

# ractor-local (derived from created ractor): verbose
'$VERBOSE' => $VERBOSE,
'$-w' => $-w,
'$-W' => $-W,
'$-v' => $-v,

# ractor local: stdin, out, err
'$stdin' => $stdin.inspect,
'$stdout' => $stdout.inspect,
'$stderr' => $stderr.inspect,
```

09/04/2022
Implementation: https://github.com/ruby/ruby/pull/3670
I'll merge it soon.

Discussion

- only accessible from main ractor?
  - $0:
    - ARGV, ARGF, $.
- only accessible from main ractor because they will be obsolete
  - $, $/ $:
- So difficult: $* / $LOADED_FEATURES and $:. $LOAD_PATH

Associated revisions

Revision 99310e3e - 10/20/2020 06:38 AM - ko1 (Koichi Sasada)
Some global variables can be accessed from ractors
Some global variables should be used from non-main Ractors.
[Bug #17268]

```ruby
# ractor-local (derived from created ractor): debug
'\$DEBUG' => $DEBUG,
'\$-d' => $-d,

# ractor-local (derived from created ractor): verbose
'\$VERBOSE' => $VERBOSE,
'\$-w' => $-w,
'\$-W' => $-W,
'\$-v' => $-v,

# process-local (readonly): other commandline parameters
'\$-p' => $-p,
'\$-l' => $-l,
'\$-a' => $-a,

# process-local (readonly): getpid
'\$?' => $?,

# thread local: process result
'\$?' => $?,

# scope local: match
'\$-' => $-.inspect,
'\$s' => $s,
'\$\' => $\,
'\$\'' => $\',
'\$+\' => $+,
'\$1' => $1,

# scope local: last line
'\$_' => $_,

# scope local: last backtrace
'\$@' => $@,
'\$!' => $!,

# ractor local: stdin, out, err
'\$stdin' => $stdin.inspect,
'\$stdout' => $stdout.inspect,
'\$stderr' => $stderr.inspect,
```

History

#1 - 10/20/2020 01:49 AM - ko1 (Koichi Sasada)
- Description updated

#2 - 10/20/2020 06:39 AM - ko1 (Koichi Sasada)
- Status changed from Open to Closed

Applied in changeset gith99310e3eb56fbc85bb45119285812eb959449d0c.
Some global variables can be accessed from ractors

Some global variables should be used from non-main Ractors.

[Bug #17268]

```ruby
# ractor-local (derived from created ractor): debug
'$DEBUG' => $DEBUG,
'$-d' => $-d,

# ractor-local (derived from created ractor): verbose
'$VERBOSE' => $VERBOSE,
'$-w' => $-w,
'$-W' => $-W,
'$-v' => $-v,

# process-local (readonly): other commandline parameters
'$-p' => $-p,
'$-l' => $-l,
'$-a' => $-a,

# process-local (readonly): getpid
'$$' => $$,

# thread local: process result
'$?' => $?,

# scope local: match
'~' => $_.inspect,
'\$' => $\,
'\$\' => \\$,
'\$\'\' => $\',
'\$\$' => $\$,
'\$\$\' => $\\$,
'\$\$\$' => $\\$\$,

# scope local: last line
'_.' => $_,

# scope local: last backtrace
'\$@' => $@,
'\$!' => $!,

# ractor local: stdin, out, err
'$stdin' => $stdin.inspect,
'$stdout' => $stdout.inspect,
'$stderr' => $stderr.inspect,
```

#3 - 10/22/2020 02:56 PM - Dan0042 (Daniel DeLorme)

Why can't ractors access global variables? Shouldn't it be like constants, where a frozen/shareable object can be accessed?

```ruby
$x = [1,2,3]
Ractor.new{ $x }.take  # I understand that this can't work
$x = true
Ractor.new{ $x }.take  # but why is this not ok?
```

#4 - 10/22/2020 07:31 PM - Eregon (Benoit Daloze)

I think this issue is mostly about "special" global variables, not so much about "regular" global variables.

I wonder if "regular" global variables should be Ractor-local, or behave like constants.

Since most of the above became Ractor-local (instead of per-Process before) or a narrower scope, I think Ractor-local would make most sense. The only special variables that are still process-local are read-only, which means it's the same as if they were Ractor-local read-only.

#5 - 10/22/2020 09:18 PM - Dan0042 (Daniel DeLorme)

Eregon (Benoit Daloze) wrote in #note-4:

I wonder if "regular" global variables should be Ractor-local, or behave like constants.

I wouldn't mind either way. Although if Ractor-local I would hope they are derived from created ractor, like $DEBUG and $VERBOSE.

#6 - 10/26/2020 04:36 PM - ko1 (Koichi Sasada)
The proposal is accepted.

I wonder if "regular" global variables should be Ractor-local, or behave like constants.

This is rejected at first by Matz (my original proposal is making all $gvars are ractor-local), to avoid confusion.